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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/550,425	10/24/2005	Peter James Andrin	DC8510 US PCT1	3320

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Thomas W Gorman
E I Du Pont De Nemours and Company
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Wilmington, DE 19805

EXAMINER

HAN, KWANG S

ART UNIT	PAPER NUMBER
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1795

MAIL DATE	DELIVERY MODE
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09/10/2008

PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No. 10/550,425	Applicant(s) ANDRIN ET AL.	
	Examiner Kwang Han	Art Unit 1795	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☐ Responsive to communication(s) filed on ____.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-3 and 27-51 is/are pending in the application.
4a) Of the above claim(s) ____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) ____ is/are allowed.
- 6) ☒ Claim(s) 1-3 and 27-51 is/are rejected.
- 7) ☐ Claim(s) ____ is/are objected to.
- 8) ☐ Claim(s) ____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 21 September 2005 is/are: a) ☐ accepted or b) ☒ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. ____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413)
Paper No(s)/Mail Date. ____. |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08)
Paper No(s)/Mail Date <u>7/27/06</u> . | 6) <input type="checkbox"/> Other: ____. |

DETAILED ACTION

Drawings

1. The drawings are objected to as failing to comply with 37 CFR 1.84(p)(5) because they do not include the following reference sign(s) mentioned in the description: For Figure 1a, all element numbers are missing; For Figure 1b all element numbers except 17 are missing; For Figure 2, all element numbers except 42 is missing. Corrected drawing sheets in compliance with 37 CFR 1.121(d) are required in reply to the Office action to avoid abandonment of the application. Any amended replacement drawing sheet should include all of the figures appearing on the immediate prior version of the sheet, even if only one figure is being amended. Each drawing sheet submitted after the filing date of an application must be labeled in the top margin as either "Replacement Sheet" or "New Sheet" pursuant to 37 CFR 1.121(d). If the changes are not accepted by the examiner, the applicant will be notified and informed of any required corrective action in the next Office action. The objection to the drawings will not be held in abeyance.

Claim Rejections - 35 USC § 102

2. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

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3. Claims 1, 29, 30, 33-37, 50, and 51 are rejected under 35 U.S.C. 102(e) as being anticipated by Mao et al. (US 2004/0096725).

Regarding claim 1, Mao et al. is directed towards an electrochemical cell component comprised of the following:

- a first coolant plate (502, 510) and an adjacent plate which is a bipolar plate (504) (Figure 8a),
- the first coolant plate comprising a mating region (506) for mating with the adjacent plate [0128, 0129] (Figure 8a, 8b),
- the plates comprising a polymer and conductive filler [0065, 0087], and
- the first coolant plate and the adjacent plate are joined by a seal formed by the polymer at the mating region and complementary region [0087].

Regarding claim 29, Mao et al. is directed towards a mating region comprised of a first rib (508) and a groove (506) [0129].

Regarding claim 30, Mao et al. is directed towards a polymer rich layer (thermoplastic sealing material) on one or both of ribs or grooves [0009].

Regarding claim 33, Mao et al. is directed towards a mating region (506) and a complementary region (508) located adjacent to the periphery of the plates (Figures 8a-8c).

Regarding claim 34, Mao et al. is directed towards manifold holes (622, 624, 626, 628) (Figure 9a) with the mating and complementary region at the periphery (Figure 8c).

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Regarding claim 35, Mao et al. is directed towards a first coolant plate and the adjacent plate each comprising at least one flow field (Elements 630, 650; Figure 9a) [0053].

Regarding claim 36, Mao et al. is directed towards plates comprised of electrically conductive material (carbon/graphite) [0065] which would inherently have a lower contact resistance than two plates which are not joined together.

Regarding claim 37, Mao et al. is directed towards the use of plates comprised of electrically conductive material [0065] and a conductive sealant (thermoplastic sealing material with carbon filler [0087]) between the plates which melts to provide a continuously connected seal with the use of a hard stop [0094] would inherently maintain a contact resistance independent of the compression pressure.

Regarding claims 50-51, Mao et al. is directed towards an electrochemical cell and more specifically a fuel cell stack comprising the cell component [Abstract].

Claim Rejections - 35 USC § 103

4. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

5. The factual inquiries set forth in *Graham v. John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.

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2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

6. This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

7. Claims 2 and 28 are rejected under 35 U.S.C. 103(a) as being unpatentable over Mao et al. as applied to claim 1 above and further in view of Bisaria et al. (US 6379795).

Regarding claim 2, the teachings of Moa et al. as discussed above are herein incorporated. Mao et al. teaches the use of plates comprised of a polymer but is silent as to the specific types.

Bisaria et al. teaches the use of thermoplastic liquid polymers and blends (Column 5, Lines 54-Column 6, Line 17) for bipolar plates used in fuel cells [Abstract] for the benefit of moldability and chemical resistance.

It would have been obvious to one of ordinary skill in the art at the time of the invention to use Bisaria's thermoplastic liquid polymers to form Mao's plate for the benefit of ease of manufacture using a moldable material and for chemical resistance for greater life in the fuel cell.

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Regarding claim 28, Mao et al. teaches the use of a carbon/polymer composite material for the plates but is silent as to the composition including graphite fibers.

Bisaria et al. teaches the use of a graphite fibers blended into the composition of the resin used to make the bipolar plates for the benefit of providing conductivity (Column 6, Lines 18-40) and an additive (carbon black, Column 8, Lines 55-65) to improve processability or properties.

It would have been obvious to one of ordinary skill in the art at the time of the invention to apply Bisaria's graphite fibers in Mao's composite material for the plates for the benefit of providing conductivity.

8. Claims 3 and 27 are rejected under 35 U.S.C. 103(a) as being unpatentable over Mao et al. modified by Bisaria et al. as applied to claim 2 above, and further in view of Takagi et al. (US 7008991).

Regarding claims 3 and 27, Mao et al. teaches the use of a maleic anhydride modified polymer for the thermoplastic seal material but is silent as to the use of the polymer in the plate. Bisaria et al. teaches the use of aromatic, crystalline thermoplastic polymers but is silent as to a maleic anhydride polymer.

Mao et al., Bisaria et al. and Takagi et al. are analogous art because they are all related to forming a conductive composite material comprised of polymers and a conductive filler such as graphite.

Takagi et al. teaches the use of a maleic anhydride polymer (Column 3, Lines 1-35) in a composition used to produce a material with improved electrical properties such

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as electroconductivity without compromise in mechanical strength and fluidity (Column 2, Lines 16-20)

It would have been obvious to one of ordinary skill in the art at the time of the invention to apply Takagi's maleic anhydride polymer in Mao et al. modified by Bisaria's plates for the benefit of providing a polymer with improved electrical properties without compromising mechanical strength and fluidity.

Takagi et al. further teaches that the composition of a blend polymer can vary depending on the composition needed to balance the properties of the polymer such as mechanical strength, modability, and conductivity (Column 9, Lines 12-27) teaching the weight percentage of each component as a result effective variable.

It would have been obvious to one of ordinary skill in the art at the time of the invention to vary the blend weight percent of the constituent polymers since it has been held that discovering the optimum ranges for a result effective variable such as percent composition involves only routine skill in the art in the absence of showing of criticality in the claimed range (MPEP 2144.05).

9. Claims 31-32 are rejected under 35 U.S.C. 103(a) as being unpatentable over Mao et al. as applied to claim 30 above, and further in view of Takagi et al.

Regarding claims 31 and 32, Mao et al. teaches the use of a polymer rich layer including a maleic anhydride polymer forming a blend with fillers such as carbon [0087].

Takagi et al. teaches that the composition of a blend polymer can vary between 5 to 95 parts by weight out of a 100 in the composition (Column 9, Lines 12-27) for the benefit of meeting required material properties.

It would have been obvious to one of ordinary skill in the art at the time of the invention to vary the composition of a blend polymer as taught by Takagi et al. in Mao's polymer rich layer for the benefit of producing a polymeric material with the required properties as is well known in the art.

It has been held that where the claimed ranges "overlap or lie inside ranges disclosed by the prior art" a prima facie case of obviousness exists. In re Wertheim, 541 F.2d 257, 191 USPQ 90 (CCPA 1976); In re Woodruff, 919 F.2d 1575, 16 USPQ2d 1934 (Fed. Cir. 1990) (MPEP 2144.05)

10. Claim 38-49 rejected under 35 U.S.C. 103(a) as being unpatentable over Mao et al. in view of Turpin et al. (WO 02/091506, as cited in IDS).

Regarding claim 38, the teachings of Mao et al. as discussed for claim 1 is herein incorporated. Mao is silent towards the mating region being welded to the complementary region to create a seal.

Turpin et al. teaches a method of forming a seal between two flow field plates of a fuel cell by ultrasonic welding for the benefit of providing a gas impermeable seal (Page 4, Line 10-Page 5, Line12).

It would have been obvious to one of ordinary skill in the art at the time of the invention to apply Turpin's ultrasonic weld in Mao's plates for the benefit of providing a gas impermeable seal.

Regarding claim 39, the applicant is directed towards the discussion for claim 2.

Regarding claim 40, the applicant is directed towards the discussion for claim 3.

Regarding claim 41, the applicant is directed towards the discussion for claim 28.

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Regarding claim 42, the applicant is directed towards the discussion for claim 29.

Regarding claim 43, the applicant is directed towards the discussion for claim 30.

Regarding claim 44, the applicant is directed towards the discussion for claim 32.

Regarding claim 45, the applicant is directed towards the discussion for claim 33.

Regarding claim 46, the applicant is directed towards the discussion for claim 34.

Regarding claim 47, the applicant is directed towards the discussion for claim 35.

Regarding claim 48, the applicant is directed towards the discussion for claim 36.

Regarding claim 49, the applicant is directed towards the discussion for claim 37.

Contact/Correspondence Information

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Kwang Han whose telephone number is (571) 270-5264. The examiner can normally be reached on Monday through Friday 8:00am to 5:00pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Susy Tsang-Foster can be reached on (571) 272-1293. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

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Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/K. H./

Examiner, Art Unit 1795

/Susy Tsang-Foster/

Supervisory Patent Examiner, Art Unit 1795